

W5YI

Nation's Oldest Ham Radio Newsletter

REPORT

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ARRL PUSHES FOR LIFETIME OPERATOR LICENSE

An operator license that can't lapse may be on the way if the American Radio Relay League gets its wish as presented to the FCC in a January 6 Petition for Rulemaking. The successful applicant for an amateur license receives a single document from the FCC, but it actually combines the operator license and station license.

In its petition, ARRL observed that although the amateur *station* license term is ten years - a period established by law - the FCC is not required to limit the term of the amateur "operator" license.

ARRL asked the FCC to grant the operator license for life. "The pressures of family obligations and business commitments often require individuals to forego amateur radio until a later time in their lives, and these persons should be encouraged to re-enter the Service when their personal circumstances permit,"

ARRL told the FCC. If the station license expires and is not renewed, a person who wants to have an amateur station would have to obtain a new station license and a new call sign, but would not have to appear before Volunteer Examiners for retesting. An operator license alone doesn't allow operation of an amateur station of the person holding only the operator license. A person holding only an operator license could, however, operate a station licensed to another amateur who holds a station license.

Incentive to keep current?

It might be argued that requiring operator license renewal encourages amateurs to keep their knowledge current. A test case could be the commercial General Radiotelephone Operator License (GROL), which the FCC issues for life.

When it decided to issue the lifetime GROL, the FCC said it does not believe that a requirement for renewal acts as an incentive to pursue continuing education: "[W]e believe that such incentive depends more on the circumstances and attributes of individual operators," it said.

Nor did the FCC believe that GROL renewal helps enforcement of its rules, because the agency already has adequate powers to take away licenses and issue fines. However, the ARRL said that issuing lifetime amateur operator licenses would have "...an interesting enforcement benefit".

The benefit is apparently that the FCC could more easily suspend or revoke an amateur license - since the operator license would never expire. The FCC once had to stop a license revocation and suspension proceeding because the license of the amateur accused of violations expired during the proceeding. This amateur later applied for a new license. The Commission was thus "...deprived of the opportunity to adjudicate the rule violations of which the former licensee

was accused," the ARRL said, adding that "A lifetime operator license would close this loophole."

Extending current licenses

ARRL said it does not propose to make the rule change retroactive. The proposal is to extend current operator licenses from ten years to a lifetime term. ARRL said that whether to extend the term of licenses that expired before any rule change "...is a separate issue which is not to be considered a part of this petition."

However, the petition appears to request that licenses which expired up to two years before the effective date of an FCC order in this proceeding should be determined to be extended for the lifetime of the operator. As an alternative, the FCC could extend licenses to lifetime term upon application.

ARRL recommendation is just that

We emphasize that the status of the ARRL request is only that of a Petition for Rule Making. The FCC has not rendered a decision on the petition, or even moved in that direction yet, and so it is futile to ask the FCC for a lifetime license now.

Anyone will, however, be allowed to file comments on the petition after the FCC issues it a Rule Making (RM) number. Here is the actual text of the Part 97 rule changes proposed by ARRL:

Section 97.17 Application for a new license

(g) A new station license will be granted to the holder of a valid operator license, upon the filing of FCC Form 610 together with proof of the existence of the operator license, without examination, provided that the operator license is not suspended or subject to unresolved enforcement proceedings, and provided further that any formerly held station license was not previously revoked or subject to unresolved enforcement proceedings. If the new station license issued to the holder of a valid operator license is applied for within two years of a previously expired station license, the call sign of the previous station license shall be available to reassignment to the applicant, in accordance with the provisions of Section 97.19(c).

Section 97.19 Application for a renewed or modified license.

(c) When the licensee has submitted a timely application for renewal of an unexpired station license (between 60 and 90 days prior to the end of the license term is recommended), the licensee may con-

tinue to operate until the disposition of the application has been determined. If a station license expires, application for renewal may be made during a grace period of 2 years after the expiration date, during which period the station call sign will be reserved for the licensee. During this grace period, the expired station license is not valid. A station license renewed during the grace period must be dated as of the date of the renewal. After the grace period, the station call sign will be deemed relinquished and will not necessarily be available for reassignment to the station licensee.

Section 97.23 License term.

(a) An amateur service station license is normally issued for a ten-year term. An amateur operator license is normally valid for the lifetime of the licensee. Any operator license issued and outstanding on or after [date to be determined by FCC], 1994, or which expired not more than two years prior to that date, shall be considered valid for the lifetime of the licensee, unless suspended or revoked, or specifically issued for a shorter term by the Commission.

LOS ANGELES EARTHQUAKE AND HAM RADIO

Bill Pasternak, WA6ITF (lives in Saugus but works in Los Angeles) told us that the bedroom community of Santa Clarita, California, has literally been cut off from the rest of L.A. due to the collapse of Highway 14 overpass onto Interstate 5. The only communications available was provided by ham radio. Bill also said that he got a chance to see the devastation of the Northridge quake first hand. A 40 minute trip to work took him nearly 4 hours on Tuesday, Jan. 18.

Several repeaters were silenced due to the lack of electricity. Others with battery, solar or generator power were dedicated to emergency and health and welfare traffic. With telephone service cut off, many stations up and down the HF bands (75, 40 and 20 meters) were relaying out-of-state phone calls into the devastated area.

R.C. "Smitty" Smith, W6RZA, who heads up the *Greater Los Angeles Amateur Radio Group (GLAARG)* VEC lives in Northridge. We were all concerned for his safety. On Wednesday, January 19th, a couple of days after the earthquake he was able to file this MCI (electronic) mail report with the rest of the VECs. Here is the text of the message:

"Damage Report from W6RZA:

1. We are located about 2.5 mi due east of the epicenter.
2. My clock stopped at 4:31:05am when it went flying off the mantle.

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3. Shaking lasted about 15 sec (seemed like an hour!)
4. All utilities (gas, water, fone, & power immediately out.
5. At first I was disoriented because the bed had turned around about 45 degrees and moved from the wall about 3 feet. Couldn't find flashlight or shoes.
6. Made my way outside through a sea of broken glass, pictures that had fallen from the wall, and miscellaneous overturned furniture.
7. At first light was able to survey the damage. No visible damage to the foundation. Lowest course of bricks on chimney was crushed and the chimney was leaning away from the house about 3 inches at the top. Many crack opened up in plaster. Still can't get the front door open. It is a 50 year old frame house. The best kind for survival.
8. Quakes continuing on about 10 or 15 minute intervals. There have been over a hundred of [Richter Scale] force 3.0 or better. Several 4.5 and 5.0 and even one 5.5. Original was 6.6 but those early numbers are always downgraded when new information becomes available.
9. Oddities: Piano moved out from wall about 6", even though it was sitting on carpet. Refrigerator now sitting out in the middle of the kitchen. Washer & Dryer sitting out in middle of wash-room. Computer CRT came flying off the top of the computer, went through the keyboard & keyboard drawer and landed on the floor. However everything still working ok.
10. Got the water & gas back early yesterday. Water has to be boiled because of lack of treatment and contamination from breaks in the system. Power has been coming on and off since about 3pm Monday. Seems to be pretty solid tonight.
11. The fone has been very erratic. It takes about 5 minutes to get a dial tone. When you get it, you can only make local calls and then only to a few exchanges. Tonight it seems to be working again. I have received a couple of long distance calls and have been able to call out once or twice.
12. Finally got the mess cleaned up inside the house and several hundred books put back in their places. Have about three packing boxes full of broken glass and many mementos trashed that cannot be replaced.
13. All in all it has been a thrilling couple of days. It was a great show. If it is all the same to you I don't think I am interested in a ticket for a repeat performance.

Thank you all for your concern,
73 de W6RZA, Smitty"

SAREX MISSION: STS-60 TO LIFTOFF FEB. 3RD.

The STS-60 flight of the Space Shuttle Discovery represents the next *Shuttle Amateur Radio Experiment* (SAREX) mission. It almost didn't happen! Both of the two astronauts qualified late for their Technician licenses. Since there would have been no other licensed amateurs on board, SAREX would have had to have been cancelled. SAREX-II serves as an educational opportunity for schools around the world to learn about space first hand by speaking directly to astronauts aboard the shuttle via ham radio.

Astronauts Charles F. Bolden, Jr. (47) of Columbia, South Carolina and Ronald M. Sega (41) of Seabrook, Texas, have been issued amateur radio call signs in preparation for their joint U.S.-Russia science mission. The Spacehab-2 objectives are primarily micro-gravity oriented with emphasis on materials and life science. Another project will involve the production of pure semi-conductor crystals in space.

Charles Bolden, KE4IQB is commander of the space shuttle Discovery due for lift off on February 3, 1994, at 12:10 UTC (6:10 a.m. CST) from Cape Kennedy. He is a graduate of the U.S. Naval Academy, a Marine Corps. Colonel and a highly decorated Vietnam aviator with more than 5,000 hours flying time. An astronaut since 1981, Bolden has flown on three space flights in 1986, 1990 and 1992.

Ron Sega (now KC5ETH) is the second of four Mission Specialists. A U.S. Air Force Academy graduate, Sega also holds a Master of Science degree in Physics from Ohio State University and a Doctorate of Electrical Engineering from the University of Colorado. Ron considers Colorado Springs his home town. This is his first space flight.

The flight of STS-60 represents an historic first. It is the initial flight of several joint U.S.-Russian Space Shuttle missions planned in preparation for the development of the international Space Station. Veteran cosmonaut **Sergei Krikalev, U5MIR**, was chosen to be the first Russian to fly on the U.S. Space Shuttle. During the 8 day flight, Cosmonaut Krikalev will support the science operations on the Space Shuttle as Mission Specialist 4.

Sergei (35) received a mechanical engineering degree in 1981 from Leningrad Mechanical Institute - now called St. Petersburg Technical University. His NASA Biographical Data Sheet lists "...amateur radio operations, particularly from space" as one of his recreational interests. He was a member of the Russian and Soviet national aerobatic flying team.

Sergei was selected as a cosmonaut in 1985 and is a veteran of two long duration MIR missions. Krikalev has logged more than 1 year and 3 months in space, and has conducted seven EVA's (space walks.) He was awarded the title of Hero of the Soviet Union

for his space flight experience. STS-60 will be the first joint U.S.-Russian human space flight since the Apollo-Soyuz Test Project in 1975 and is the first to involve Russian and American space travelers on the same crew.

Last year, Sergei attended the Dallas Ham-Com convention and told us he would try to qualify for a U.S. ham license - but his rigorous training duties have prevented him from doing so. Since no reciprocal operating privileges exist between Russia and the United States, Sergei will operate amateur radio under Bolden's control operator authority. They plan to contact several schools as part of the SAREX program - including one in Russia.

The possibility also exists for the first U.S. Space Shuttle to MIR Space Station (Russian astronaut-to-Russian cosmonaut) amateur radio contact! Three new Russian amateurs were launched on January 8, 1994 aboard a Soyuz TM-18 rocket and docked at MIR on January 10th. The new crew #15 are all amateurs: Viktor Afanasiev (commander) U9MIR, Yuri Usachev (flight engineer) R3MIR and Valerij Polyakov (doctor) U3MIR. U3MIR will attempt to break Musa Manarov's record for remaining in space by staying aboard MIR until April '95. They are using the call sign R0MIR on packet.

The SAREX operations on STS-60 include voice and packet. Preliminary discussions between the astronauts and the SAREX working group indicate that the Shuttle crew will be extremely busy with the numerous payloads on this flight. This information is being provided so the amateur community will be aware that voice operations might be rare on this flight.

Packet radio operations are expected when the crew is not engaged in voice operations. Please remember that this is a preflight prediction. The astronauts and the SAREX working group said they cannot guarantee this prediction.

STS-60 Shuttle Amateur Radio Experiment:

Mission: STS-60 - Space Shuttle Discovery
Payloads: WSF-1 (Wake Shield Facility - A free-flying high vacuum manufacturing platform) & Spacehab-2 Module
Launch: Feb. 3, 1994, 12:10 UTC - KSC
Landing: Feb. 11, 1994 17:39 UTC - KSC
Duration: 8 days, 5 hours, 32 minutes
Orbit: 57 degree inclination
Altitude: 190 nautical miles
Crew: Commander, Pilot & 4 Mission Specialists (Six - two are Amateurs)
SAREX Modes FM Voice
Prime callsign: K14IQB (Commander Bolden's callsign.)
Packet Radio: Callsign W5RRR-1
Frequencies: All operations in split mode. Do not transmit on the downlink frequency.

Voice Freqs:

Downlink: 145.55 MHz (By the way, this is the same frequency used by the MIR space station cosmonauts.)
Uplinks: 144.91, 144.93, 144.95, 144.97, 144.99 MHz (Except Europe).
Europe only: 144.70, 144.75, 144.80 MHz.

Note: The crew will not favor any specific uplink frequency, so your ability to work the crew will be the "luck of the draw."

Packet Freqs:

Downlink: 145.55 MHz; Uplink: 144.49 MHz.

Information available from:

Goddard Amateur Radio Club, WA3NAN, Greenbelt MD - SAREX Bulletins and Shuttle Retransmissions: 3860, 7185, 14,295, 21,395, 28,650 KHz (SSB) and 147.45 MHz (FM)

Johnson Space Center ARC, W5RRR, Houston, TX SAREX Bulletins 7225, 14,280, 21,395, 28,650 KHz, (SSB) and 146.64 MHz (FM)

ARRL Amateur Radio Station, W1AW, Newington, CT SAREX Bulletins: 3990, 7290, 14,290, 18,160, 21,390, and 28,590 KHz (SSB) and 147.555 MHz (FM)

Also, bulletins available on the Internet, via AMSAT News Service, Compuserve, and your local PBSS.

School Group Participation:

Five school groups will participate in SAREX with pre-scheduled direct and telebridge contacts. These include four in the U.S., and one in Russia.

AMATEUR RADIO CALL SIGNS

...issued as of the first of January 1994:

Radio	Gp."A"	Gp."B"	Gp."C"	Gp."D"
<u>District</u>	<u>Extra</u>	<u>Advan.</u>	<u>Tech/Gen</u>	<u>Novice</u>
0 (*)	AA0PX	KG0KT	N0ZVT	KB0LNT
1 (*)	AA1IF	KD1TF	N1RBP	KB1BEY
2 (*)	AA2QX	KF2TH	N2XPB	KB2QVE
3 (*)	AA3GT	KE3LP	N3RFS	KB3BAB
4 (*)	AD4OO	KR4KT	(***)	KE4IUQ
5 (*)	AB5SB	KJ5UA	(***)	KC5EUX
6 (*)	AB6ZM	KN6XD	(***)	KE6EJD
7 (*)	AB7AT	KI7UQ	(***)	KC7AEN
8 (*)	AA8NR	KG8GG	(***)	KB8RAN
9 (*)	AA9JX	KF9TH	N9VWX	KB9IWO
N.Mariana Isl.	AH0W	AH0AQ	KH0CK	WH0AAY
Guam	NH2Z	AH2CU	KH2IM	WH2ANI
Johnston Isl.	AH3D	AH3AD	KH3AG	WH3AAG
Midway Isl.		AH4AA	KH4AG	WH4AAH
Hawaii	(**)	AH6NE	WH6QU	WH6CRB
Kure Isl.			KH7AA	
Amer. Samoa	AH8H	AH8AG	KH8AB	WH8ABB
Wake W.Peale	AH9C	AH9AD	KH9AE	WH9AAI
Alaska	(**)	AL7PM	WL7PP	WL7CHL
Virgin Isl.	WP2D	KP2CC	NP2GY	WP2AHU
Puerto Rico	(**)	KP4WC	(***)	WP4MMN

NOVEMBER VE PROGRAM STATISTICS

<u>November</u> <u>No. VEC's</u>	<u>1991</u> 18	<u>1992</u> 18	<u>1993</u> 18
<u>Testing Sessions</u>	694	797	1010
<u>VEC</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>
ARRL	46.0%	43.7%	46.6%
W5YI	38.9	41.3	34.9%
CAVEC	3.6	3.9	4.0
WCARS	N/A	2.6	2.2
GtLakes	4.0	1.9	1.4
SunnyV	N/A	1.1	1.2
Others (12)	N/A	5.5	9.7
Year-to-Date Sessions	7257	9080	9914
<u>Elements Administ.</u>	13615	13685	17733
<u>VEC</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>
ARRL	54.4%	49.3%	56.7%
W5YI	28.9	32.3	27.4
CAVEC	4.6	4.3	4.0
WCARS	N/A	2.3	2.2
SunnyV	N/A	2.5	3.0
GtLakes	2.6	1.7	1.4
Others (12)	N/A	7.6	5.3
Year-to-Date Elements	154465	176309	176859
<u>Applicants Tested</u>	8131	8107	10140
<u>VEC</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>
ARRL	53.0%	48.4%	55.4%
W5YI	28.9	33.5	27.5
CAVEC	4.1	4.4	4.4
WCARS	N/A	2.2	2.4
SunnyV	N/A	2.2	2.6
GtLakes	4.2	1.7	1.7
Others (12)	N/A	7.6	6.0
Year-to-Date Tested	92876	105656	103462
<u>November</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>
Pass Rate - All	66.0%	65.3%	64.5%
Applicants/Session	11.7	10.2	10.0
Elements/Applicant	17	1.7	1.7
Sessions Per VEC	38.6	44.3	56.1
<u>Administrative Errors by VE's/VEC's</u>			
<u>November</u>	<u>1991</u>	<u>1992</u>	<u>1993</u>
Defect. Applications	0.5%	0.1%	0.2%
Late Filed Sessions	0.6%	1.6%	3.6%
Defective Reports	0.9%	0.1%	0.1%

Note: The two largest VEC's, (ARRL/W5YI) accounted for 81.5% of all November 1993 test sessions, 84.1% of the exam elements and 82.9% of the applicants tested.
[Source: Personal Radio Branch/FCC; Washington, D.C.]

BIOLOGICAL EFFECTS AND POTENTIAL HAZARDS OF RADIOFREQUENCY RADIATION ...AND ITS POTENTIAL IMPACT ON AMATEUR RADIO

The Federal Communications Commission is considering new rules that could require radio amateurs (and other FCC licensees) to show that they comply with guidelines for radio frequency radiation safety recommended jointly by the *American National Standards Institute* (ANSI) and the *Institute of Electrical and Electronic Engineers* (IEEE).

The deadline for comments on the proposed FCC regulations, contained in Docket 93-62, is January 25, with reply comments due Feb. 24. These deadlines have been extended three times at the request of various industry groups. This FCC proposal raises extremely complex engineering and public health issues; compliance could cost broadcasters and other commercial licensees millions of dollars. Industry groups have been frantically gathering data about the possible effect of this proposal on their businesses -- but the proposal could also have a huge effect on radio amateurs.

For about 10 years the FCC has required many of its licensees (such as radio and television stations and many other commercial services) to prove that their operations would not expose their employees or the public to RF radiation in excess of the ANSI guideline, then designated as C95.1-1982. However, up to now radio amateurs have been categorically exempt from having to meet the ANSI guideline.

In the current proceeding, the FCC proposes to change the rules in several ways. First, the FCC proposes to replace the 10-year-old ANSI C95.1-1982 guideline with the new and much stricter ANSI C95.1-1992 guideline. Second, the FCC proposes to eliminate the categorical exemption for radio amateurs, which could result in amateurs having to prove that their transmissions do not expose anyone to RF radiation in excess of the 1992 ANSI guidelines.

In the past, the FCC has required many commercial licensees to provide engineering calculations or measurements (or in some cases, both) to show that their transmissions did not create RF fields exceeding the ANSI guideline as part of the environmental review of their license applications.

In Docket 93-62, the FCC has not explained how amateurs would be expected to prove that they meet the new ANSI standard. Nor did the commission explain how it would handle the huge amount of paperwork that would result if 600,000 amateurs are required to submit detailed engineering reports comparable to those now required from some commercial licensees.

The FCC also left open the question of whether amateurs would merely have to meet the ANSI guide-

line for exposure in places where everyone is aware of the RF fields (this is commonly thought of as the standard for occupational exposure) or the much stricter ANSI standard for exposure to the general public.

Members of the American Radio Relay League's Board of Directors are understood to have discussed this FCC proposal at their July meeting and again at a later Executive Committee meeting. Although the ARRL's comments in Docket 93-62 had not yet been formally filed with the FCC at this writing, board members have indicated that ARRL will argue for a continuation of the categorical exemption for radio amateurs, and for use of the more liberal standard for occupational exposure if amateurs are not categorically exempt.

If adopted in its most stringent form, Docket 93-62 proposal could result in enormous costs for amateurs, because accurate meters to measure RF power densities are expensive. Manufacturers such as General Microwave and Narda Microwave sell their least expensive power density meters for prices well into four figures.

Also, the proposal could force the curtailment of certain amateur radio activities. In 1990, the FCC and the Environmental Protection Agency jointly conducted a field survey of the RF fields at the stations of volunteer amateurs in Southern California. The FCC/EPA team concluded that most amateur activities do not create RF fields in excess of either the old or new ANSI standard. A well-matched antenna at least 35 feet above any inhabited area, fed with a well-shielded coaxial cable, produces fields far too weak to create any health concern, according to the FCC/EPA team's measurements.

However, the FCC/EPA measurements showed that near a mobile, indoor or attic-mounted antenna, the RF fields sometimes exceed the ANSI standard. Conceivably, the FCC could now adopt rules regulating the circumstances under which such antennas could be used by amateurs.

Another controversial issue concerns hand-held transceivers. All transmitters with less than seven watts of output power were categorically exempt under the old ANSI standard, but the new standard reduced that exemption by a factor of five (to 1.4 watts) for exposure to persons not aware of the RF fields, reflecting the ongoing scientific debate about the safety of handy talkies.

Why is the FCC proposing to adopt the new ANSI standards, and to remove the exemption for amateurs? The FCC is responding to the growing body of medical evidence that under some circumstances, electromagnetic fields, including both RF fields and the low frequency fields created by power lines and home appliances, may pose certain health hazards. There has also been sensational publicity in the mass media

about this controversial issue. When the FCC adopted the Notice of Proposed Rule Making in Docket 93-62, FCC Commissioner Ervin Duggan filed a separate statement in which he said that the FCC's action was NOT prompted by the sensational media publicity. However, it seems clear that the FCC cannot ignore this issue in part because of the growing public concern.

While separating fact from fantasy is difficult in any evolving field of scientific inquiry, the problem has been greatly complicated in the case of electromagnetic radiation (EMR) by both the emotional nature of the public debate and the huge financial stakes for industry if EMR levels must be reduced to protect public health.

For example, if it can be shown conclusively that children living near high-tension lines have abnormally high rates of leukemia (as a number of studies conducted in several different countries have already indicated), the cost to electric utilities (and indirectly to all of us as ratepayers) could run into billions of dollars. Many power lines would have to be relocated, and wider buffer zones would have to be created along those that cannot be relocated for one reason or another.

Likewise, FCC licensees might have to undertake costly steps to minimize public exposure to RF energy, and the fact that there are questions about the safety of RF energy sources (including amateur radio stations) could lead to new restrictions on amateur antennas by local governments and homeowners associations, among other rulemaking authorities.

At this point, new research about the biological effects of EMR is reported in medical journals almost weekly. While there is a great deal that we still do not know, there is strong evidence that it does in fact have some health effects, even at low levels. This evidence comes from two different kinds of research: epidemiological studies of public health patterns and laboratory research into the effects of EMR on human and animal tissue.

Much has already been written in amateur radio publications and elsewhere about the question of EMR and health. The ARRL has a Committee on the Biological Effects of RF Energy that regularly monitors new research in this field. Ivan Shulman, WC2S, chairman of the ARRL Bio-Effects Committee, wrote a detailed article about the problem for QST several years ago. The W5YI Report has published numerous articles about this issue, and new sections have been added to both The ARRL Handbook and The ARRL Antenna Book covering RF safety.

To summarize briefly, both RF and low frequency fields are classified as nonionizing radiation because the frequency is too low for there to be enough photon energy to ionize atoms. Ionizing radiation, on

the other hand, has a variety of very serious (and well publicized) adverse health effects. But nonionizing radiation also has health effects.

It has been known since the early days of radio that at sufficiently high levels RF energy could heat body tissue enough to cause blindness, sterility and other health effects. What we are learning today is that even at athermal levels (levels too low to cause body heating) there are also demonstrable health effects. We know, for instance, that low frequency magnetic fields, as well as RF fields that are keyed, modulated or pulsed at a low frequency rate, affect the manner in which human cells intercommunicate. Cancer-fighting T-cells in the immune system rely on subtle chemical and electrical messages that pass through the cell membrane to determine that a particular cell has become cancerous. It has been shown in laboratories that low-level EMR can alter this vital communication through the cell membrane. Other laboratory research has shown that low level EMR can disrupt the human body's circadian rhythms (the body's internal "clock"), cause chromosome damage, and alter the body's level of melatonin, a hormone that reduces the risk of certain cancers if present in appropriate quantities.

Research has shown that EMR at levels even weaker than the Earth's geomagnetic field has biological effects. How can this be? The Earth's magnetic field as a static field. All of life has evolved in this constant field. Natural electromagnetic fields are also created by the sun and thunderstorm activity; life as we know it has adapted to those fields. However, in the last 100 years, man-made fields with very different intensities and spectral distributions have altered the natural electromagnetic environment in ways that have their own biological effects.

In addition to the laboratory research that has identified biological effects of EMR, there has now been extensive epidemiological research into EMR and health. In fact, Dr. Samuel Milham's much-publicized 1988 medical journal article about amateur radio and cancer was based on an epidemiological study of the mortality rates of amateurs in California and Washington state. The study noted statistically significant excess mortality among radio amateurs from two kinds of cancer, but did not prove there was a causal link.

There have been many other studies correlating occupational exposure to RF and/or low-frequency fields with higher than normal rates of various cancers, most notably leukemia, non-Hodgkins lymphoma and brain cancer (Milham's study of amateurs found significant excess mortality from the first two, but not from brain cancer). As noted earlier, a number of studies have shown that children living near high-tension lines have higher than normal rates of leukemia. The recent nationwide Swedish studies confirmed earlier findings

of both excess leukemia among children living near high-tension lines and abnormal rates of certain cancers among workers exposed to high levels of EMR. Another study found that microwave workers with 20 years of exposure to EMR had 10 times the normal rate of brain cancer if they were also exposed to soldering fumes or electronic solvents. Typically, these chemical factors alone increase the risk about twofold.

On the other hand, there are some nagging questions that remain unanswered. Several studies of workplace EMR exposures and health have yielded contradictory results. Often spot measurements of electromagnetic fields do not correlate with the observed health effects, even within homes near power lines. There is also evidence that there may be window effects: Some studies have shown health effects at certain frequencies but not at others (e.g., 25-30 Hz and 45 Hz, but not 35-40 Hz), at certain field intensities but not in stronger or weaker fields, and in certain relationships to the Earth's static magnetic field but not others. The normal adage about carcinogens, "If some is bad, more is worse," may not apply to EMR. We appear to be dealing with very subtle and complex relationships between EMR and health.

In view of the uncertainties in this field, many public health officials are now urging "prudent avoidance," the common-sense idea that it is wise to avoid unnecessary exposure to EMR until there is a more complete understanding of its health effects. This philosophy has led some countries (notably Sweden) to adopt exposure standards far more stringent than even the new 1992 ANSI standard. And in the United States, the National Council for Radiation Protection and Measurement has adopted a voluntary standard that in some respects is considerably stricter than the new ANSI standard. In fact, the ANSI committee that adopted the new standard was criticized by some public health researchers for being excessively influenced by industry groups with a financial stake in the status quo.

Be that as it may, the new ANSI standard exists, and the FCC now proposes to use it as a processing guideline for licensed services, including amateur radio stations. (*Excerpted from a paper by Wayne Overbeck, N6NB and published in the "The Proceedings of the 27th Annual Conference of the Central States VHF Society."*)

ARRL COMMITTEE MEMBERS FILE COMMENTS ON RF ENERGY SAFETY AND AMATEUR RADIO *Scientists Believe Amateurs Would Adopt "Prudent Avoidance" of Hazardous Fields*

Several prominent researchers - members of the ARRL Committee on Biological Effects of RF Energy - recently told the FCC their latest findings and

recommendations on radiofrequency health issues. Although they were appointed to advise the ARRL Board on RF & health, they submitted comments with the FCC on their own behalf and not as ARRL representatives - an unusual approach. Separate comments will be filed by the League's Board of Directors.

The commenters are *Ivan Shulman, M.D. - WC2S* (Malibu, California), committee chair; *W. Ross Adey, M.D. - K6UI* (Redlands, CA), *David J. Rodman, M.D. - KN2M* (Buffalo, NY) and *Wayne Overbeck, Ph.D./J.D. - N6NB* (Tustin, CA). Overbeck is a previous ARRL Southwestern Division Vice Director.

As mentioned on the previous pages, the FCC is considering adopting a new guideline for exposure to RF energy. The researchers told the FCC:

- Amateurs have been exempt from the environmental safety reviews that certain other radio services must perform. Amateurs have not been required to calculate the field intensities from their transmissions or to certify to the FCC that their operations pose no health hazard. Such reviews and measurements would make emergency and portable operation difficult and most hams do not have the technical skills and finances needed to comply with environmental review requirements.

This policy is appropriate; most amateur activities preclude exposure to fields that exceed American National Standards Institute (ANSI) guidelines. However, some amateur activities do produce significant field intensities in populated areas.

A 100 W mobile station at 144 MHz may well produce fields in excess of the ANSI guideline inside the vehicle. Hand-held transceivers and indoor antennas may produce significant localized fields near the antenna. Specialized operations such as EME moonbounce involve high gain antennas and high power levels, but these operators are typically experienced and competent and are careful not to point arrays toward inhabited places.

"It seems clear that most amateurs cannot be expected to perform the kind of environmental review required of many other Commission licensees," the scientists said, "But it is also clear that some amateur licensees engage in operating activities that generate significant electromagnetic fields."

- The FCC should not subject all amateurs to requirements of environmental studies and processing, because it would be too expensive and would inundate the FCC with paperwork, the researchers argued.

Instead, the FCC should place in Part 97 a chart showing the calculated field intensities at various distances from antennas having various directive patterns, driven by transmitters of various power output levels. This chart might indicate the thresholds set by the

1992 ANSI guideline, if the FCC chooses to adopt that guideline as a standard for exposure to RF energy.

The FCC could also add questions about electromagnetic safety to license exams, and require applicants to certify that they have read and understood the FCC guidelines and agree to comply.

- "Given sufficient information about the potential hazards of utilizing high power in a vehicular mobile installation (or with an indoor antenna), for example, we believe most amateurs would adopt the philosophy of prudent avoidance developed by Professor M. Granger Morgan at Carnegie Mellon University.

...[P]rudent avoidance obligates the user of electromagnetic devices to avoid unnecessary exposure in the home and the workplace as a common-sense response to potential -- but not yet proven -- health hazards. Already, the RF safety sections of major ARRL publications urge radio amateurs to practice prudent avoidance wherever possible."

Defects of ANSI Guideline; Important Evidence Ignored

The scientists said they wish to state, in the "...strongest possible terms," that the ANSI guideline the FCC is studying whether to adopt (ANSI C95.1-1992), fails to consider two crucial issues: The effect of LF modulation, pulsing, and keying of signals; and the growing body of evidence that athermal [non-temperature related] effects of electromagnetic energy must be taken into account.

"There cannot now be any doubt that very low level fields have demonstrable biological effects, particularly when a radio signal is modulated, keyed or pulsed at certain low frequencies," they said, adding that the committee that developed the ANSI guideline "...chose to ignore the significant volume of highly credible scientific evidence on athermal effects."

"Even worse, the ANSI/IEEE guidelines appear to have become a refuge for special interests for whom the very existence of health problems at athermal levels of exposure would have important (and costly) consequences."

- The commenters appended Dr. Adey's detailed review of research in biological effects of RF energy - which advances the view that transmissions that do not heat tissues may still cause biological effects. "In the case of hand-held RF devices, such as mobile telephones, radiated powers below 1 watt are generally too weak to produce biologically significant heating, even when operated close to the body," the study said. "Nevertheless, these and much weaker ELF and RF fields can elicit major biochemical responses in healthy and diseased body cells."

W5YI REPORT

Nation's Oldest Ham Radio Newsletter

Page #9
February 1, 1994

• **RACES, ARES, Salvation Army and Red Cross hams worked very close together** during the L.A. earthquake ...a team effort with everyone cool, calm and collected.

The 147.705 repeater in Southern California handled most of the Red Cross earthquake health and welfare traffic. The Red Cross stationed ham operators at more than ten shelters. New "No-Code" Technicians are handled themselves like old pros!

First word of freeway collapses heard on repeaters 5 minutes after they happened! Hams had more news on the severity of the quake than all local TV and radio since they were able to report the damage among themselves immediately from location.

Southern California hams handled hundreds of incoming health and welfare calls because they could dial within the local area when callers outside California could not get in. West Coast Amateur Radio Club member, **Cliff Johnson, KM6ZM** dialled 229 phone calls for out-of-state hams who had inquiries about families and friends. Many other hams doing the same!

• **SuperBall has a three hour life!** In our last issue we told about Super-Ball 1-94, a 76 ft. diameter long duration balloon carrying amateur radio telemetry and ATV. The launch took place Friday, January 7, at 1626 UTC (10:26 a.m. CST). After a final payload check-out, enough helium for 120,000 feet was metered in. The balloon headed north-east and telemetry was copied on both 2 and 15 meters, and ATV sent back video of the balloon.

As expected, the balloon began to change course as it came out of the troposphere and reached higher layers. At about 1804 UTC the balloon unexpectedly burst. A quick drop in the differential pressure (difference between inside and outside pressures) from 1.11 to 0.03 was one of the first clues that something had changed radically.

Hams in eastern Utah actually watched the rupture on ATV and later saw the parachute deploy. GPS readings stabilized at about 2130 UTC and the package is believed to have come to rest at that time.

The landing site is in Utah's Uinta Mountains in the neighborhood of Wolf Creek Summit, a 9500-foot pass. Plans were made to locate and retrieve the

payload on Saturday, Jan 15th with the help of snowmobiles and the Wasatch County Search and Rescue Team. The first attempt failed but was successful the following day.

The reason for the rupture is still uncertain. One possibility is that turbulence in the troposphere caused severe twisting and kept the balloon from unfurling properly as it gained altitude. This, in turn, kept the helium from spreading through the balloon properly and resulted in too high a differential pressure. The twisting phenomenon was viewed on ATV. Another launch is planned in about a month. (Thanks: WB7QBC & N7SHV)

• In our Oct. 15th issue (page 10) we told you about how **Terry Van Sickle, WB5WXI of Dallas got caught by the FBI transmitting to McDonald's** employees last August through their menu board. He used a hand-held transceiver tuned to 154.6 MHz - just above the amateur 2-meter band. For starters he got fired from his job as a video reporter for the local Channel 8 TV station.

On Jan. 14th he was sentenced in U.S. District Court for the Northern District of Texas to 90 days home confinement. "The defendant will maintain a telephone at his place of residence without call forwarding, a modem, caller-ID, call waiting, or portable cordless telephones for the above period. At the direction of the defendant's probation officer, the defendant shall wear an electronic monitoring device and follow electronic monitoring procedures specified by the defendant's probation officer. The defendant shall pay the cost of the monitoring service as determined by the U.S. Probation Office."

Van Sickle was also ordered to pay a \$1,000 fine plus a \$25 special assessment. He could have received 6 months in prison, a year's probation plus a \$5,000 fine.

• **Tucson Amateur Packet Radio has moved its offices.** The new mailing address is:

Tucson Amateur Packet Radio
8987-309 E. Tanque Verde Rd. #337
Tucson, Arizona 85749-9399

The voice telephone number is (817) 383-0000. This number has a voice mail system attached and is available 24 hours a day. The incoming FAX number is (817) 566-2544.

• The story on the following page was condensed from an article written by **Gordon West, WB6NOA**, who serves as a volunteer for the Earthwinds' Balloon technical team. He is specifically assigned to launch-pad to capsule communications during liftoff, as well as capsule-to-school and capsule-to-ham communications during the flight.

The **Earthwinds Hilton Balloon** is unique in that it consists of two balloons - the upper zero-pressure contains helium for lift and the bottom is filled with air under pressure which acts as a ballast. Excess helium vents automatically equalizing its internal pressure to that of the surrounding atmosphere. Liquid helium from storage tanks can be gassified to replenish lost helium during flight. The pilot initiates descent by releasing helium through three electric valves at the top of the balloon.
UPPER BALLOON: 180 ft. high x 100 ft. diameter at launch. 140 ft. round at floating altitude. Capacity: 1.1 million cu. ft. helium, equal to about 5½ Good-year blimps.

LOWER ANCHOR BALLOON: 100 ft. round pressurized ball filled with 555,000 cu. ft. of air. Air replenished by electric blower inside the anchor balloon, thus increasing the ballast weight. Varying this weight should keep Earthwinds in a virtually level flight.

CAPSULE: Designed by Burt Rutan, who also designed *Voyager*, the only plane to circle the globe non-stop without refueling. Size: 10 ft. by 24 ft. Weight: 7½ tons at take-off. Power: Two Honda gasoline-powered generators. Pressurization: Maintained at 8,000 ft. above sea level; 65-70° F.

AMENITIES: Daily newspaper sent fax by Hilton, first run movies by Spectradyn "in room" system, direct dial satellite telephone to any exchange in the world. Meals: thermal-stabilized food, similar to meals used on space flights.

EXPERIMENTS: NASA research on upper air turbulence and the jet stream. Earthwind's trajectory recorded using GPS. Russian "Obzor" investigation of the ozone layer, aerosol particle contamination and ultraviolet radiation.

CREW: Larry Newman, KB7JGM (pilot), Vladimir Dzhanibekov, RV3DD, and Richard Abruzzo (who holds the world ballooning duration record of 144 hours.) Newman is the only human who has ever crossed both the Atlantic and Pacific Oceans by helium balloon.

"EARTHWINDS" ROUND-THE WORLD BALLOON GROUNDS OUT AGAIN - HAMS SAVE THE DAY!

"Earthwinds Hilton is up and away," announces Bob Davis, KG7IY, president of SNARS (Sierra Nevada Amateur Radio Society) over 146.940 MHz, the local coordination for ham radio operators providing support communications during the tricky liftoff procedure. "And she is rising well over 100 feet per minute, so we are looking good on this fourth launch attempt for their float around the world," says Davis over 2 meters.

The Earthwinds Hilton balloon and its three-man crew have had its share of problems just getting off the launch pad, let alone drifting around the world! It was two years ago in Akron, Ohio, that a gust on wind blew the balloon off the launch pad, and sent it bouncing down the field for almost a mile.

And a year ago at the Stead Field Airport in Reno, Nevada, in sub-zero weather, the balloon did not gain enough altitude to drift over a local mountain range, and crashed. It was a capsule-installed 2-meter transceiver that Earthwinds pilot, Larry Newman, KB7JGM, used to signal Mayday on the other side of the mountain slope.

Last November opened up a third window of opportunity where the jetstream weather conditions would be just right to take Earthwinds around the globe in about ten days. Captain Newman's experience with 2 meters caused him to add back-up 2 meter mobile capabilities aboard the capsule, plus a specially designed Metz 2-meter half-wave antenna that was all stainless steel, including the coil.

Last November's launch was proceeding smoothly through the night. The SNARS amateur radio club was providing security communications for the perimeter, plus communications between the safety officers to keep everyone well back from the actual launch area. At about 3 a.m., the capsule achieved positive lift from the helium going into the upper balloon. Gordon West, WB6NOA spent a few moments inside the capsule finishing up on the numerous two-way radios on board, and stepped out of the capsule to double check that the high frequency long wire antenna was in its proper position.

All of a sudden there was a giant BANG and the capsule shot upward, having pulled loose from the anchor bolt. Seconds later it was jerked to a halt on safety cables attached to perimeter tow trucks. The strain was so great that it actually moved some of the tow trucks several feet before the capsule came back under control. Amateur radio was the first to broadcast that there was a problem.

Launch attempt #4 took place two weeks ago (Jan. 12), a year after the second failure. Once again, amateur radio proved its effectiveness in adapting itself to almost any situation that might arise. The SNARS communication team was already in position even before the sun set the night before. Commercial radio traffic was handled on commercial frequencies and only amateur radio type communications were passed on the ham bands even though the new "no business" rules are now more liberal.

Throughout the night and the pre-dawn hours lift-off communications ran smoothly. At exactly 7:11 a.m. Earthwinds attempt #4 went into a picture perfect launch. Just as the sun was rising over the valley floor, explosive charges cut through the steel cables holding Earthwinds on the launch pad, and she began to rise into the chilly 13 degree air. The higher she rose, the more majestic Earthwinds looked as glimmering frost slithered down the sides of the upper and lower balloon, creating a trail of colorful fog as she climbed higher and higher.

"This is fantastic," commented pilot Larry Newman, KB7JGM, on 145.550 MHz. "When we are out of simplex range, we'll meet you on the 146.760 repeater." In about forty-five minutes, Earthwinds disappeared from view as she passed through 30,000 feet.

About an hour into the flight, Captain Newman operated on the 146.76 repeater to talk third party to Baron Hilton, Earthwinds financier. The communications were upbeat, and Larry indicated they were almost up to altitude where they would begin to start working the valves to hold their position in the jet stream. Hilton was very impressed with the clarity of the amateur repeater communications.

A little while later, however, another call through the 146.760 MHz repeater was one that no one wanted to hear. "This is Earthwinds, KB7JGM ...we have a mechanical problem, can you hear us? Over."

Thirty minutes of communications through the repeater soon doomed around-the-world attempt #4. The lower air-ballast balloon vent valve became frozen by ice from the condensation off the lower balloon, and would not open or close. This meant there would be no capabilities of ballasting, and an immediate descent by venting helium from the upper balloon was required. The coordination for the decision to abort was handled through the repeater before they dropped down to the point where they fell out of the repeater input. After 7 hours and 200 miles, Earthwinds landed in an open field just west of Fresno, California.

Thanks to the initial ham radio call on 2-meters, plus HF communications to chase planes and helicopters, the 370-foot tall, 10-ton balloon, with its revolutionary hour glass shape, settled into the California dirt field without any damage to the capsule.

Will there be an around-the-world launch attempt #5 soon? We hope so - hams around the world are looking forward to the opportunity to work the capsule simplex on 145.550 MHz. And even after four failures, ham radio operators are enthusiastic and optimistic about their communications for an upcoming launch.

"The hams were cold and tired after the launch, but are ready to jump into action as soon as we are needed for the next launch," comments Bob Davis, SNARS president. And handling that distress call through the repeater on launch #4, and the distress call on the mountain side during launch #2, was no big deal for hams. This is stuff we can do at any time and under any conditions. It's what we're hear for," adds Davis.

Next launch? SOON, says pilot Newman, KB7JGM.